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RADER FISHMAN & GRAUER PLLC
LION BUILDING
1233 20TH STREET N.W., SUITE 501
WASHINGTON, DC 20036

EXAMINER	
GOFF II, JOHN L	

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 04202004

Application Number: 09/355,946
Filing Date: August 16, 1999
Appellant(s): NAKAMURA ET AL.

Robert Green
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 2/18/04.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is substantially correct. The changes are as follows: Regarding applicants issues 1-3, the rejections over Iverson (U.S. Patent 2,628,180) are withdrawn.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 5, 7, 8, 11, and 12 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

A substantially correct copy of appealed claims 5, 7, 8, 11, and 12 appears on pages 12-14 of the Appendix to the appellant's brief. The minor errors are as follows: Claim 5, line 4 should require depositing a polymerizable monomer. The word polymerizable was omitted from the claims in the Appendix.

(9) Prior Art of Record

(A) Listing of Prior Art of Record

3,471,353	RASMUSSEN	10-1969
3,514,359	FRESE	5-1970
4,717,624	IKENAGA et al.	1-1988
T888,001	DRAKE	7-1971

(B) Brief Description of the Prior Art of Record

Rasmussen discloses bonding two oriented polyolefin sheets through a method comprising depositing a solvent on a surface of the sheets followed by applying pressure and heat to bond the two sheets together. Rasmussen teaches the solvent dissolves the sheets at their surface. Rasmussen teaches solvents such as xylene may be used. However, Rasmussen is not limited to any particular solvent.

Frese discloses bonding two polyolefin sheets through a method comprising depositing a solvent on a surface of one or both sheets followed by applying pressure and heat to bond the two sheets together. Frese teaches the solvent dissolves the sheets at their surface. Frese teaches the solvent may comprise liquid hydrocarbons such as xylene, polymerizable hydrocarbons (e.g.

styrene monomer) and peroxide wherein the peroxide is added to increase the speed of polymerization.

Ikenaga et al. disclose bonded composites (e.g. including polyolefin containing) comprising a plurality of stacked sheets. Ikenaga et al. teach the stacked and bonded sheets comprise alternating oriented sheets having minus values for the average coefficient of linear expansion (LEC) next to oriented or unoriented sheets having plus values for the average LEC wherein the alternating arrangement of plus and minus values for the average LEC give the bonded composites improved dimensional stability.

Drake discloses bonding two polyolefin sheets through a method comprising heat treating (e.g. by flame treatment, electrical discharge treatment, etc.) a surface of each film followed by applying pressure and heat to bond the two sheets together.

(10) Grounds of Rejection

It is noted the rejections over Iverson (U.S. Patent 2,628,180) are withdrawn.

The following ground(s) of rejection are applicable to the appealed claims:

Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rasmussen (U.S. Patent 3,471,353) in view of Frese (U.S. Patent 3,514,359).

Rasmussen discloses bonding two oriented polyolefin (e.g. polyethylene, polypropylene, etc.) sheets through a method comprising depositing a solvent on a surface of the sheets followed by applying pressure and heat to bond the two sheets together. Rasmussen teaches the solvent dissolves the sheets at their surface. Rasmussen teaches solvents such as xylene may be used. However, Rasmussen is not limited to any particular solvent (Figure and Column 2, lines 4-30 and Column 4, lines 8-13). It would have been obvious to one of ordinary skill in the art at the

time the invention was made to use as the solvent taught by Rasmussen one comprising a polymerizable monomer (e.g. styrene) and peroxide as it was well known in the art to bond two polyolefin sheets together using this type of solvent as shown for example by Frese whereby speed of polymerization would have been increased and only the expected results would have been achieved.

Frese discloses bonding two polyolefin sheets through a method comprising depositing a solvent on a surface of one or both sheets followed by applying pressure and heat to bond the two sheets together. Frese teaches the solvent dissolves the sheets at their surface. Frese teaches the solvent may comprise liquid hydrocarbons such as xylene, polymerizable hydrocarbons (e.g. styrene monomer) and peroxide wherein the peroxide is added to increase the speed of polymerization, or combinations thereof (Column 1, lines 36-38 and 52-72 and Column 2, lines 1-17 and 42-51 and Column 3, lines 4-6 and the Examples).

As to the oriented polyolefin sheets taught by Rasmussen having an average coefficient of linear expansion (LEC) not exceeding 5×10^{-5} (/°C) in the 20-80 °C range, it is noted the oriented polyolefin materials employed in Rasmussen are the same as those claimed by applicant and they are consistent and in agreement with applicants specification (Page 9, lines 7-11) such that the oriented polyolefin sheets taught by Rasmussen would intrinsically have the claimed average LEC values. Furthermore, applicants admitted prior art indicates that unoriented polyolefins have an average LEC of greater than 5×10^{-5} (/°C) and it is only the inclusion of orientated polyolefin material that lowers the average LEC value below 5×10^{-5} (/°C) such that applicants admitted prior art is evidence that the oriented polyolefin sheets taught by Rasmussen have the claimed average LEC values (Specification Page 7, lines 13-24).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasmussen and Frese as applied to claims 5 and 7 above, and further in view of Ikenaga et al. (U.S. Patent 4,717,624).

Rasmussen and Frese as applied above teach all of the limitations in claim 8 except for a teaching on using as the oriented polyolefin sheets one having a minus average coefficient of linear expansion (LEC) and one having a plus average LEC. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the oriented polyolefin sheets taught by Rasmussen as modified by Frese oriented sheets having alternating plus and minus average LEC values to form laminated composites with improved dimensional stability as suggested by Ikenaga et al.

Ikenaga et al. disclose bonded composites (e.g. including polyolefin containing) comprising a plurality of stacked sheets. Ikenaga et al. teach the stacked and bonded sheets comprise alternating oriented sheets having minus values for the average coefficient of linear expansion (LEC) next to oriented or unoriented sheets having plus values for the average LEC wherein the alternating arrangement of plus and minus values for the average LEC give the bonded composites improved dimensional stability (Column 1, lines 20-29 and 43-68 and Column 2, lines 12-26 and 30-43 and Column 11, lines 38-30 and Column 12, lines 41-53).

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rasmussen and Frese as applied to claims 5 and 7 above, and further in view of Drake (U.S. T888,001).

Rasmussen and Frese as applied above teach all of the limitations in claims 11 and 12 except for a teaching on heat treating the oriented polyolefin sheets before bonding. It would

have been obvious to one of ordinary skill in the art at the time the invention was made to heat treat the oriented polyolefin sheets taught by Rasmussen as modified by Frese before bonding as it was well known in the art as shown for example by Drake to heat treat a polyolefin sheet prior to boding so that it better adheres to additional polyolefin sheets.

Drake discloses bonding two polyolefin sheets through a method comprising heat treating (e.g. by flame treatment, electrical discharge treatment, etc.) a surface of each film followed by applying pressure and heat to bond the two sheets together (Figure and Abstract).

Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frese in view of Rasmussen.

The teachings of Frese are described above. Frese is silent as to using oriented or unoriented polyolefin sheets. It would have been well within the purview of one of ordinary skill in the art at the time the invention was made to use as the polyolefin sheets taught by Frese oriented polyolefin sheets as it was well known in the art to bond two oriented polyolefin sheets together using a solvent bonding process as shown for example by Rasmussen (Rasmussen is described above) as those skilled in the art readily appreciate oriented sheets have greater strength than unoriented sheets.

As to the oriented polyolefin sheets taught by Frese as modified by Rasmussen having an average coefficient of linear expansion (LEC) not exceeding 5×10^{-5} (/°C) in the 20-80 °C range, it is noted the oriented polyolefin materials employed in Frese as modified by Rasmussen are the same as those claimed by applicant and they are consistent and in agreement with applicants specification (Page 9, lines 7-11) such that the oriented polyolefin sheets taught by Frese as modified by Rasmussen are seen to have the claimed average LEC values. Furthermore,

applicants admitted prior art indicates that unoriented polyolefins have an average LEC of greater than 5×10^{-5} (/°C) and it is only the inclusion of orientated polyolefin material that lowers the average LEC value below 5×10^{-5} (/°C) such that applicants admitted prior art is evidence that the oriented polyolefin sheets taught by Frese as modified by Rasmussen have the claimed average LEC values (Specification Page 7, lines 13-24).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Frese and Rasmussen as applied to claims 5 and 7 above, and further in view of Ikenaga et al.

Frese and Rasmussen as applied above teach all of the limitations in claim 8 except for a teaching on using as the oriented polyolefin sheets one having a minus average coefficient of linear expansion (LEC) and one having a plus average LEC. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the oriented polyolefin sheets taught by Frese as modified by Rasmussen oriented sheets having alternating plus and minus average LEC values to form laminated composites with improved dimensional stability as suggested by Ikenaga et al. (Ikenaga et al. is described above).

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frese and Rasmussen as applied to claims 5 and 7 above, and further in view of Drake.

Frese and Rasmussen as applied above teach all of the limitations in claims 11 and 12 except for a teaching on heat treating the oriented polyolefin sheets before bonding. It would have been obvious to one of ordinary skill in the art at the time the invention was made to heat treat the oriented polyolefin sheets taught by Frese as modified by Rasmussen before bonding as it was well known in the art as shown for example by Drake (Drake is described above) to heat treat a polyolefin sheet so that it better adheres to additional polyolefin sheets.

(11) Response to Argument

It is noted the rejections over Iverson (U.S. Patent 2,628,180) are withdrawn such that the arguments regarding Iverson are moot.

Appellant argues, "Frese '359 discloses a process of adhering polyolefin objects. The adhesive disclosed in Frese '359 comprises

1. a liquid hydrocarbon,
2. optionally liquid polymerizable hydrocarbons, and,
3. if liquid polymerizable hydrocarbons are present, the addition of a radical forming compound, for example benzoyl peroxide, to obtain radical polymerization. See col. 1, lines 51-56 and col. 2, lines 5-17.

It is clear the examiner is ignoring that this is a **three component adhesive**, and that there is a distinction to be made between the necessary use of the liquid hydrocarbons, and that the liquid hydrocarbon is different from liquid polymerizable hydrocarbons. That is, the liquid polymerizable hydrocarbons are dissolved in the liquid hydrocarbons. See also claims 1 and 2.

Accordingly, there are clear distinctions between the adhesives disclosed in the references and the claimed two-part adhesive. Additionally, the examiner has not demonstrated that the two-part adhesive in claim 5 would be obvious. More particularly, the examiner has not demonstrated how it would be obvious to change the number of components in the adhesive, and the examiner has not shown that the modified adhesive would have the same properties as the adhesive in the reference. Stated differently, Frese '359 would require the subtraction of the liquid hydrocarbons. However, the liquid hydrocarbons are required in Frese '359 to perform as disclosed. Accordingly, removing a component from Frese '359 is not something one of skill in

the art would consider doing, and there is no motivation in Frese '359 to remove the liquid hydrocarbons component."

Claim 5 requires "depositing a peroxide, combined with a polymerizable monomer capable of dissolving polyolefin". Frese teaches bonding two polyolefin sheets using a solvent wherein the solvent comprises liquid hydrocarbons (e.g. xylene), polymerizable hydrocarbons (e.g. styrene monomer) and peroxide wherein the peroxide is added to increase the speed of polymerization, or combinations thereof. Additionally, Frese teaches that the solvent dissolves the polyolefin sheets at their surface such that clearly the claimed limitations are met. Example 24 in particular is pointed out as a specific showing in Frese of bonding two polyolefin sheets by depositing only a polymerizable monomer (e.g. styrene monomer which is capable of dissolving polyolefin) and peroxide on the surface of the sheets followed by heat pressing wherein a bond having a tensile strength of 24.5 (the second highest tensile strength of the 27 examples shown in Frese) is obtained. Furthermore, it is noted claim 5 does not exclude depositing additional components along with peroxide and polymerizable monomer, and applicant does not claim a two component adhesive as argued, rather claim 5 merely requires an adhesive comprising peroxide and polymerizable monomer. Note that the preamble to the claim uses open language ("comprising") and that the adhesive recited does NOT expressly exclude additional solvents therein. Thus, the general teaching of Frese of a solvent comprising liquid hydrocarbons (e.g. xylene), polymerizable hydrocarbons (e.g. styrene monomer), and peroxide, what appellant contends is a three component adhesive taught by Frese, meets the claim limitations.

Regarding the additional references to Rasmussen, Ikenaga et al., and Drake, it should be noted that appellant does not expressly discuss the teachings of these references (other than to

say they do not cover the deficiencies of Frese). Because appellant has failed to address the teachings of the references, it is believed appellant agrees with the Office interpretation of these references. As the noted deficiencies of Frese are not present (as addressed above), the rejections that include the references to Rasmussen, Ikenaga et al., and Drake should be sustained.

In conclusion, appellant's claims are not commensurate in scope with their arguments relating to a two component adhesive. Additionally the use of an adhesive which included a peroxide and a monomer capable of dissolving polyolefin was suggested by Frese (see in particular example 24).

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

John Goff
April 27, 2004

JEFF H. AFTERGUT
PRIMARY EXAMINER
GROUP 1300

Conferees

Richard Crispino

Steve Griffin

Jeff Aftergut

RADER FISHMAN & GRAUER PLLC
LION BUILDING
1233 20TH STREET N.W., SUITE 501
WASHINGTON, DC 20036